



## SEQUENCE LISTING

<110> Degussa AG  
May, Oliver  
Drauz, Karlheinz  
Buchholz, Stefan

<120> Screening Process for Hydantoin Racemases

<130> 7601/84454

<140> 10/559,434  
<141> 2005-12-05

<150> PCT/EP2004/005239  
<151> 2004-05-15

<160> 16

<170> PatentIn version 3.3

<210> 1  
<211> 6  
<212> PRT  
<213> Artificial sequence

<220>  
<223> consensus sequence found in hydantoin racemase sequence of  
Arthrobacter crystallopoietes

<220>  
<221> misc\_feature  
<222> (2)..(2)  
<223> Xaa is an amino acid selected from A, R, N, D, C, Q, E, H, I, L,  
K, M, F, P, S, T, Y or V

<220>  
<221> misc\_feature  
<222> (4)..(4)  
<223> Xaa is an amino acid selected from P and T

<400> 1

Phe Xaa Asp Xaa Gly Leu  
1 5

<210> 2  
<211> 236  
<212> PRT  
<213> Arthrobacter crystallopoietes

<400> 2

Met Arg Ile Leu Val Ile Asn Pro Asn Ser Ser Ser Ala Leu Thr Glu  
1 5 10 15

Ser Val Ala Asp Ala Ala Gln Gln Val Val Ala Thr Gly Thr Ile Ile  
20 25 30

Ser Ala Ile Asn Pro Ser Arg Gly Pro Ala Val Ile Glu Gly Ser Phe  
           35                          40                          45

Asp Glu Ala Leu Ala Thr Phe His Leu Ile Glu Glu Val Glu Arg Ala  
       50                          55                          60

Glu Arg Glu Asn Pro Pro Asp Ala Tyr Val Ile Ala Cys Phe Gly Asp  
       65                          70                          75                          80

Pro Gly Leu Asp Ala Val Lys Glu Leu Thr Asp Arg Pro Val Val Gly  
                           85                          90                          95

Val Ala Glu Ala Ala Ile His Met Ser Ser Phe Val Ala Ala Thr Phe  
                           100                          105                          110

Ser Ile Val Ser Ile Leu Pro Arg Val Arg Lys His Leu His Glu Leu  
           115                          120                          125

Val Arg Gln Ala Gly Ala Thr Asn Arg Leu Ala Ser Ile Lys Leu Pro  
       130                          135                          140

Asn Leu Gly Val Met Ala Phe His Glu Asp Glu His Ala Ala Leu Glu  
       145                          150                          155                          160

Thr Leu Lys Gln Ala Ala Lys Glu Ala Val Gln Glu Asp Gly Ala Glu  
                           165                          170                          175

Ser Ile Val Leu Gly Cys Ala Gly Met Val Gly Phe Ala Arg Gln Leu  
           180                          185                          190

Ser Asp Glu Leu Gly Val Pro Val Ile Asp Pro Val Glu Ala Ala Cys  
       195                          200                          205

Arg Val Ala Glu Ser Leu Val Ala Leu Gly Tyr Gln Thr Ser Lys Ala  
       210                          215                          220

Asn Ser Tyr Gln Lys Pro Thr Glu Lys Gln Tyr Leu  
       225                          230                          235

<210> 3  
 <211> 711  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> mutated hydantoin racemase sequence of Arthrobacter  
           crystallopoietes

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 gcagcacaac aagttgtcgc gaccggcacc ataatttctg ccatcaaccc ctccagagga 120  
 cccgccgtca ttgaaggcag ctttgacgaa gcaactggcca cgttccatct cattgaagag 180  
 gtggagcgcg ctgagcgggg aaacccgccc gacgcctacg tcatcgcatg tttcagggat 240  
 ccgggacttg acgcggtcaa ggagctgact gacaggccag tggtaggagt tgccgaagct 300  
 gcaatccaca tgtcttcatt cgtcgcggcc accttctcca ttgtcagcat cctcccgagg 360  
 gtcaggaaac atctgcacga actggtacgg caagcggggg cgacgaatcg cctcgcctcc 420  
 atcaagctcc caaatctggg ggtgatggcc ttccatgagg acgaacatgc cgcactggag 480  
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 accagcaaag cgaactcgta tcaaaaaccg acagagaagc agtacctcta g 711

<210> 4  
 <211> 236  
 <212> PRT  
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 <220>  
 <223> mutated hydantoin racemase sequence of *Arthrobacter*  
*crystallopoietes*

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 Ser Val Ala Asp Ala Ala Gln Gln Val Val Ala Thr Gly Thr Ile Ile  
 20 25 30  
 Ser Ala Ile Asn Pro Ser Arg Gly Pro Ala Val Ile Glu Gly Ser Phe  
 35 40 45  
 Asp Glu Ala Leu Ala Thr Phe His Leu Ile Glu Glu Val Glu Arg Ala  
 50 55 60  
 Glu Arg Glu Asn Pro Pro Asp Ala Tyr Val Ile Ala Cys Phe Arg Asp  
 65 70 75 80  
 Pro Gly Leu Asp Ala Val Lys Glu Leu Thr Asp Arg Pro Val Val Gly  
 85 90 95

Val Ala Glu Ala Ala Ile His Met Ser Ser Phe Val Ala Ala Thr Phe  
                   100                  105                  110

Ser Ile Val Ser Ile Leu Pro Arg Val Arg Lys His Leu His Glu Leu  
           115                  120                  125

Val Arg Gln Ala Gly Ala Thr Asn Arg Leu Ala Ser Ile Lys Leu Pro  
       130                  135                  140

Asn Leu Gly Val Met Ala Phe His Glu Asp Glu His Ala Ala Leu Glu  
   145                  150                  155                  160

Thr Leu Lys Gln Ala Ala Lys Glu Ala Val Gln Glu Asp Gly Ala Glu  
                   165                  170                  175

Ser Ile Val Leu Gly Cys Ala Gly Met Val Gly Phe Ala Arg Gln Leu  
                   180                  185                  190

Ser Asp Glu Leu Gly Val Pro Val Ile Asp Pro Val Glu Ala Ala Cys  
       195                  200                  205

Arg Val Ala Glu Ser Leu Val Ala Leu Gly Tyr Gln Thr Ser Lys Ala  
       210                  215                  220

Asn Ser Tyr Gln Lys Pro Thr Glu Lys Gln Tyr Leu  
   225                  230                  235

<210> 5  
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<220>  
 <223> mutated hydantoin racemase sequence of *Arthrobacter*  
           *crystallopoietes*

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 gcagcacaac aagttgtcgc gaccggcacc ataatttctg ccatcaaccc ctccagagga 120  
 cccgccgtca ttgaaggcag ctttgacgaa gcactggcca cgttccatct cattgaagag 180  
 gtggagcgcg ctgagcgggg aaacccgccc gacgcctacg tcatcgcatg ttctgaggat 240  
 ccgggacttg acgcggtcaa ggagctgact gacaggccag tggtaggagt tgccgaagct 300  
 gcaatccaca tgtcttcatt cgtcgcggcc accttctcca ttgtcagcat cctcccgagg 360  
 gtcaggaaac atctgcacga actggtacgg caagcggggg cgacgaatcg cctcgcctcc 420  
 atcaagctcc caaatctggg ggtgatggcc ttccatgagg acgaacatgc cgcaactggag 480

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acgctcaaac aagccgccaa ggaggcggtc caggaggacg gcgccgagtc gatagtgtc      540
ggatgcgccg gcatggtggg gtttgcgct caactgagcg acgaactcgg cgtccctgtc      600
atcgaccccg tcgaggcagc ttgccgcgtg gccgagagtt tggtcgctct gggctaccag      660
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<210> 6
<211> 236
<212> PRT
<213> Artificial sequence

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<220>
<223> mutated hydantoin racemase sequence of Arthrobacter
      crystallopoietes

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<400> 6

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Met Arg Ile Leu Val Ile Asn Pro Asn Ser Ser Ser Ala Leu Thr Glu
1              5              10              15

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Ser Val Ala Asp Ala Ala Gln Gln Val Val Ala Thr Gly Thr Ile Ile
      20              25              30

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```

Ser Ala Ile Asn Pro Ser Arg Gly Pro Ala Val Ile Glu Gly Ser Phe
      35              40              45

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```

Asp Glu Ala Leu Ala Thr Phe His Leu Ile Glu Glu Val Glu Arg Ala
      50              55              60

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Glu Arg Glu Asn Pro Pro Asp Ala Tyr Val Ile Ala Cys Phe Glu Asp
      65              70              75              80

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Pro Gly Leu Asp Ala Val Lys Glu Leu Thr Asp Arg Pro Val Val Gly
      85              90              95

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Val Ala Glu Ala Ala Ile His Met Ser Ser Phe Val Ala Ala Thr Phe
      100             105             110

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Ser Ile Val Ser Ile Leu Pro Arg Val Arg Lys His Leu His Glu Leu
      115             120             125

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Val Arg Gln Ala Gly Ala Thr Asn Arg Leu Ala Ser Ile Lys Leu Pro
      130             135             140

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Asn Leu Gly Val Met Ala Phe His Glu Asp Glu His Ala Ala Leu Glu
      145             150             155             160

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Thr Leu Lys Gln Ala Ala Lys Glu Ala Val Gln Glu Asp Gly Ala Glu  
 165 170 175

Ser Ile Val Leu Gly Cys Ala Gly Met Val Gly Phe Ala Arg Gln Leu  
 180 185 190

Ser Asp Glu Leu Gly Val Pro Val Ile Asp Pro Val Glu Ala Ala Cys  
 195 200 205

Arg Val Ala Glu Ser Leu Val Ala Leu Gly Tyr Gln Thr Ser Lys Ala  
 210 215 220

Asn Ser Tyr Gln Lys Pro Thr Glu Lys Gln Tyr Leu  
 225 230 235

<210> 7  
 <211> 711  
 <212> DNA  
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<220>  
 <223> mutated hydantoin racemase sequence of *Arthrobacter*  
*crystallopoietes*

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 gcagcacaac aagttgtcgc gaccggcacc ataatttctg ccatcaaccc ctccagagga 120  
 cccgccgtca ttgaaggcag ctttgacgaa gcaactggcca cgttccatct cattgaagag 180  
 gtggagcgcg ctgagcgagg aaacccgccc gacgcctacg tcatcgcatg tttccaggat 240  
 ccgggacttg acgcggtcaa ggagctgact gacaggccag tggtaggagt tgccgaagct 300  
 gcaatccaca tgtcttcatt cgtcgcggcc accttctcca ttgtcagcat cctcccagg 360  
 gtcaggaaac atctgcacga actggtacgg caagcggggg cgacgaatcg cctcgcctcc 420  
 atcaagctcc caaatctggg ggtgatggcc ttccatgagg acgaacatgc cgactggag 480  
 acgctcaaac aagccgcca ggagggcggtc caggaggacg gcgccgagtc gatagtgtc 540  
 ggatgcgccg gcatggtggg gtttgcgctg caactgagcg acgaactcgg cgtcctctgtc 600  
 atcgaccccg tcgaggcagc ttgccgcgtg gccgagagtt tggtcgctct gggctaccag 660  
 accagcaaag cgaactcgta tcaaaaaccg acagagaagc agtacctcta g 711

<210> 8  
 <211> 236  
 <212> PRT  
 <213> Artificial sequence

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<223> mutated hydantoin racemase sequence of *Arthrobacter crystallopoietes*

<400> 8

Met Arg Ile Leu Val Ile Asn Pro Asn Ser Ser Ser Ala Leu Thr Glu  
1 5 10 15

Ser Val Ala Asp Ala Ala Gln Gln Val Val Ala Thr Gly Thr Ile Ile  
20 25 30

Ser Ala Ile Asn Pro Ser Arg Gly Pro Ala Val Ile Glu Gly Ser Phe  
35 40 45

Asp Glu Ala Leu Ala Thr Phe His Leu Ile Glu Glu Val Glu Arg Ala  
50 55 60

Glu Arg Glu Asn Pro Pro Asp Ala Tyr Val Ile Ala Cys Phe Gln Asp  
65 70 75 80

Pro Gly Leu Asp Ala Val Lys Glu Leu Thr Asp Arg Pro Val Val Gly  
85 90 95

Val Ala Glu Ala Ala Ile His Met Ser Ser Phe Val Ala Ala Thr Phe  
100 105 110

Ser Ile Val Ser Ile Leu Pro Arg Val Arg Lys His Leu His Glu Leu  
115 120 125

Val Arg Gln Ala Gly Ala Thr Asn Arg Leu Ala Ser Ile Lys Leu Pro  
130 135 140

Asn Leu Gly Val Met Ala Phe His Glu Asp Glu His Ala Ala Leu Glu  
145 150 155 160

Thr Leu Lys Gln Ala Ala Lys Glu Ala Val Gln Glu Asp Gly Ala Glu  
165 170 175

Ser Ile Val Leu Gly Cys Ala Gly Met Val Gly Phe Ala Arg Gln Leu  
180 185 190

Ser Asp Glu Leu Gly Val Pro Val Ile Asp Pro Val Glu Ala Ala Cys  
195 200 205

Arg Val Ala Glu Ser Leu Val Ala Leu Gly Tyr Gln Thr Ser Lys Ala  
210 215 220

Asn Ser Tyr Gln Lys Pro Thr Glu Lys Gln Tyr Leu  
 225 230 235

<210> 9  
 <211> 711  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> mutated hydantoin racemase sequence of *Arthrobacter*  
*crystallopoietes*

<400> 9  
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 cccgccgtca ttgaaggcag ctttgacgaa gcactggcca cgttccatct cattgaagag 180  
 gtggagcgcg ctgagcgggg aaacccgccc gacgcctacg tcatcgcatg tttcttggat 240  
 ccgggacttg acgcggtcaa ggagctgact gacaggccag tggtaggagt tgccgaagct 300  
 gcaatccaca tgtcttcatt cgtcgcggcc accttctcca ttgtcagcat cctcccagg 360  
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 acgctcaaac aagccgcca ggaggcggtc caggaggacg gcgccgagtc gatagtgtc 540  
 ggatgcgccg gcatggtggg gtttgcgct caactgagcg acgaactcgg cgtccctgtc 600  
 atcgaccccg tcgaggcagc ttgccgcgtg gccgagagtt tggtcgctct gggctaccag 660  
 accagcaaag cgaactcgta tcaaaaaccg acagagaagc agtacctcta g 711

<210> 10  
 <211> 236  
 <212> PRT  
 <213> Artificial sequence

<220>  
 <223> mutated hydantoin racemase sequence of *Arthrobacter*  
*crystallopoietes*

<400> 10

Met Arg Ile Leu Val Ile Asn Pro Asn Ser Ser Ser Ala Leu Thr Glu  
 1 5 10 15

Ser Val Ala Asp Ala Ala Gln Gln Val Val Ala Thr Gly Thr Ile Ile  
 20 25 30

Ser Ala Ile Asn Pro Ser Arg Gly Pro Ala Val Ile Glu Gly Ser Phe  
 35 40 45



Asp Glu Ala Leu Ala Thr Phe His Leu Ile Glu Glu Val Glu Arg Ala  
50 55 60

Glu Arg Glu Asn Pro Pro Asp Ala Tyr Val Ile Ala Cys Phe Leu Asp  
65 70 75 80

Pro Gly Leu Asp Ala Val Lys Glu Leu Thr Asp Arg Pro Val Val Gly  
85 90 95

Val Ala Glu Ala Ala Ile His Met Ser Ser Phe Val Ala Ala Thr Phe  
100 105 110

Ser Ile Val Ser Ile Leu Pro Arg Val Arg Lys His Leu His Glu Leu  
115 120 125

Val Arg Gln Ala Gly Ala Thr Asn Arg Leu Ala Ser Ile Lys Leu Pro  
130 135 140

Asn Leu Gly Val Met Ala Phe His Glu Asp Glu His Ala Ala Leu Glu  
145 150 155 160

Thr Leu Lys Gln Ala Ala Lys Glu Ala Val Gln Glu Asp Gly Ala Glu  
165 170 175

Ser Ile Val Leu Gly Cys Ala Gly Met Val Gly Phe Ala Arg Gln Leu  
180 185 190

Ser Asp Glu Leu Gly Val Pro Val Ile Asp Pro Val Glu Ala Ala Cys  
195 200 205

Arg Val Ala Glu Ser Leu Val Ala Leu Gly Tyr Gln Thr Ser Lys Ala  
210 215 220

Asn Ser Tyr Gln Lys Pro Thr Glu Lys Gln Tyr Leu  
225 230 235

<210> 11

<211> 25

<212> DNA

<213> Artificial sequence

<220>

<223> PCR plasmid for amplifying plasmids containing a sequence encoding  
hydantoin racemase of *Arthrobacter crystallopoietes*

<400> 11

gccgcaagga atggtgcatg catcg

<210> 12  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> PCR plasmid for ampifying plasmids containg a sequence encoding  
 hydantoin racemase of Arthrobacter crystallopoietes

<400> 12  
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<210> 13  
 <211> 5777  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> plasmid containing sequence encoding hydantoin racemase of  
 Arthrobacter crystallopoietes

<400> 13  
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 tctgccatca acccctccag aggacccgcc gtcattgaag gcagctttga cgaagcactg 180  
 gccacgttcc atctcattga agaggtggag cgcgctgagc gggaaaaccc gcccgacgcc 240  
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ggccgtaata	tccagctgaa	cggctctggt	ataggtacat	tgagcaactg	actgaaatgc	3960
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